

REMARKS

Claims 1-33 were pending, including independent Claims 1, 8, 15 and 27. The proposed amendment cancels Claims 15-33, so if it is entered Claims 1-14 will be pending, including independent Claims 1 and 8.

The proposal to cancel Claims 15-33 is without prejudice to the Applicant's right to further pursue these claims in this or a derivative application. The Applicant believes that these claims are properly allowable over the known prior art, and cancels them only in the interest of promptly completing prosecution of this application. In view of this proposed cancellation, the Examiner's grounds for rejection of Claims 15-33 are moot, and will be further addressed only when these or similar claims are resubmitted for examination.

Premature Final Rejection:

In the previous Office Action issued May 2, 2007 ("the first Office Action"), Claims 2 and 9 were rejected only as anticipated by Cluff. In the responsive Amendment filed August 30, 2007 ("the first Response"), the subject matter of Claims 2 and 9 was incorporated directly into Claims 1 and 8, respectively, such that the scope of Claims 1 and 8 became identical to the scope of Claims 2 and 9 as originally filed. Because it did not change the scope of Claims 2 and 9, but only their reference number, this amendment did not necessitate a new ground of rejection.

Nevertheless, the Examiner finally rejected these claims on a new ground in the current Office Action, as being obvious over Cluff in view of Laing, and did not repeat (hence tacitly withdrew) the previous rejection of these claims as anticipated by Cluff. Nor was the Laing reference submitted to the USPTO in an IDS during the period set forth in 37 CFR 1.97(c), but instead was before the Examiner during the first Office Action, as indicated by the Examiner's initials on the Applicant's form 1449, submitted with an IDS dated January 12, 2005, which was included with the first Office Action.

In view of these facts, the Applicant respectfully requests the Examiner to withdraw the finality of the rejections in the current Office Action because it is premature. The Manual of Patent Examining Procedure, section 706.07(a) "Final Rejection, When Proper on Second Action," states (emphasis added):

Under present practice, second or any subsequent actions on the merits shall be final, except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims, nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p).

Withdrawal of the finality of rejection will be particularly helpful to examination of the subject application insofar as the Examiner therefore considers the enclosed IDS, which, in combination with further remarks set forth below, supports prompt allowance of the subject application.

Current Information Disclosure Statement (IDS)

The prosecution of the subject application will benefit significantly from consideration of the IDS enclosed herewith. The disclosed papers document the examination, by US examiner Alan Diamond, of PCT application PCT/US02/32550, which is substantially identical to the subject application as to currently pending independent Claims 1 and 8 (corresponding to Claims 2 and 23 of PCT/US02/32550). Examiner Diamond's conclusions support the Applicant's assertion, set forth in subsequent remarks, that Claims 1-14, as presently pending, are nonobvious over the cited combination of Cluff and Laing.

The Applicant's representative regrets having believed that the prosecution of closely related applications was brought to Examiners' attention by USPTO internal practices. No patent practitioner in the representative's experience followed a policy of submitting related-application information despite all having otherwise thorough Information Disclosure policies and procedures, and consequently the mistaken belief was not corrected. Only upon review of the recent case of *McKesson v. Bridge* (Fed. Cir. 2007) did the Applicant's representative become aware that such information is NOT reliably presented to Examiners except by Information Disclosure Statements.

The attached IDS should be considered as satisfying 37 CFR 1.97(c)(2) when the finality of the current rejections are withdrawn as premature.

Alternatively, the attached IDS documents should be considered in view of the likely helpfulness of the opinion of Examiner Diamond in respect of claims identical to the currently pending independent claims.

As a further alternative ground, the attached IDS documents should be considered as evidence in support of patentability. In view of the cancellation of Claims 15-33, the submitted information is entirely favorable to the Applicant's position that the pending claims should be allowed, and as such may be considered to fall outside the duty of disclosure.

For any or all of the reasons set forth above, the Examiner is respectfully requested to consider the information submitted in the attached IDS.

Rejection of Claims 1-4, 7-10, 13 and 14 under 35 U.S.C. §103 over Cluff in view of Laing

Previous examiner found claims novel and inventive over the cited prior art: US Examiner Alan Diamond considered substantially identical claims as now stand rejected, above, and found them novel and inventive over prior art that expressly included Cluff and the newly-cited Laing reference. Examiner Diamond's examination was performed pursuant to the Patent Cooperation Treaty, in respect of application PCT/US02/32550 that corresponds closely to the subject US application.

Claims 1-40 of PCT/US02/32550 include claims 2 and 23 that are substantially identical to Claims 1 and 8, respectively, as currently pending, and also include claims requiring features substantially similar to those required in any of Claims 2-7 and 9-14 as presently pending. Thus, to a first approximation Claims 1-40 of PCT/US02/32550 are a superset of Claims 1-14 as presently pending.

Examiner Diamond's International Search Report (ISR) included only four references that he indicates are relevant to Claims 1-40 of PCT/US02/32550 (corresponding to Claims 1-14 as presently pending, as remarked above). The reference newly cited by the Examiner herein, Laing '177, is one of those four relevant references; however, it is listed as an "A" reference, reflecting Examiner Diamond's belief that Laing helps define the general state of the art, but "is not considered to be of particular relevance."

In the Written Opinion issued 22 August 2003 in respect of PCT/US02/32550, Examiner Diamond rejected all of Claims 1-40 as anticipated by Cluff, a rejection substantially identical to the Examiner's rejection of Claims 1-14 in the first Office Action in respect of the subject application. In response to the Written Opinion, on 22 November 2003 the Applicant submitted arguments that particularly pointed out distinctions between Cluff and (among others) claims 2 and 23 of PCT/US02/32550. In response to those arguments, Examiner Diamond agreed that those claims, and indeed all of claims 2-21 and 23-40, were both novel and inventive over the cited prior art of record. In view of the fact that the relevant prior art of record was limited to Cluff, Laing '177 and two other Laing references, it is clear that Examiner Diamond considered Claims 2-21 and 23-40 of PCT/US02/32550 to be inventive over Cluff and Laing together. Examiner Diamond's final opinion was set forth in the International Preliminary Examination Report (IPER) issued 9 December 2003. Copies of each of the noted documents are incorporated in the attached IDS.

Examiner Diamond did not expressly set forth the present ground of rejection of these claims as obvious over Cluff in view of Laing, nor does the Applicant wish to rely exclusively upon Examiner Diamond's opinion. Accordingly, further remarks are set forth below that independently support a conclusion that Claims 1 and 8, as currently pending, are nonobvious over Cluff in view of Laing.

Laing expressly teaches avoidance of two-axis tracking. The Cluff reference describes "two-axis tracking" of the sun, which is well known and widely practiced. The Laing reference, by contrast, is expressly directed to avoiding such two-axis tracking. For example, the Laing reference states (Abstract, underlining added for emphasis): "The aim of the invention is to ensure an approximately uniform conversion rate of the solar radiation largely independently of the height of the sun while avoiding the use of a twin-axis follower system." It is immediately made apparent that a skilled person, following the teaching of Laing, would not create a two-axis (or "twin-axis") tracking system. It is clearly not obvious to combine teachings in a manner that is directly opposite to the teaching of one of them.

Laing also devotes most of the brief "prior art" (background) section of the patent to disparaging two-axis tracking in favor of the single-axis tracking taught, stating (underlining added for emphasis):

Current technology involves mechanical tracking systems which tilt the concentrators in two planes, so that the normal on the converter plane with respect to the azimuth and the sun's elevation always points exactly to the sun. By reason of their complexity such technical solutions are only competitive with other electricity-producing systems in exceptional cases. In addition, the aperture surfaces of all tracking systems need large relative distances from each other to avoid mutual shading which results in lower area utilization. The costs are much lower if two-dimensional concentrating systems are installed on the north-south axis and are moved once per day around this axis. Also costs are lower if concentrators which are installed parallel to the diameter of a platform follow the azimuth of the sun by revolving the platform around its vertical axis. The disadvantage of this arrangement is that the daily yield is low because the radiation will irradiate almost perpendicular only twice per day.

The aim of the invention is to ensure an approximately uniform solar conversion which is largely independent of the sun elevation. This is accomplished by avoiding two-axis tracking systems and the use of a given surface almost totally as the aperture surface to capture the radiation.

A more vehement rejection of two-axis tracking systems is difficult to imagine. As such, a skilled person, following the teaching of Laing, would be led to reject the idea of two-axis tracking. This is quite the opposite of rendering such an invention obvious.

Laing was unable to implement two-axis tracking for pontoon solar energy collection. In order to enable concentrating solar collectors to be effectively disposed in pontoons supported by a liquid bath, the Applicant had to solve technical problems that John Laing, the sole inventor of the cited Laing reference (the '177) and an expert in the field, was unable to solve. Though working as a low-level technician having no design duties for \$6 per hour, the Applicant nevertheless recognized the problems that prevented John Laing

from implementing two-axis tracking with pontoon solar energy collectors. The Applicant's first-hand observation of the inefficiencies of Laing's system that led him to realize that if the technical problems could be overcome, then a more efficient system could be implemented. However, Laing's pontoons were entirely incompatible with two-axis tracking for at least the reasons that are set forth below.

Two primary problems existed. The first problem with pontoons such as taught by Laing was that its passive cooling would become ineffective if the pontoons were tilted at substantial angles from vertical. Unlike the Laing single-axis tracking approach, two-axis tracking requires that the pontoons be tilted at significant angles away from vertical. Conventionally mounted solar energy converting devices would be raised above the level of the liquid bath if the pontoon was significantly tilted, thereby drastically raising the thermal impedance between the converting device and the passive cooling liquid, rendering the passive cooling ineffective and causing the devices to overheat. The second problem, mutual shading, is expressly described by Laing (as quoted above) as a reason to eschew two-axis tracking. Pontoons are closely spaced for efficient use of available collection area (areal efficiency); but when they are, each pontoon necessarily shadows its neighbor at low elevations. This mutual shading is a serious problem because the conversion efficiency of concentrating photovoltaic cells is dramatically reduced by uneven illumination. These two problems- cooling and mutual shading - each, or in combination, preclude the improvements in efficiency needed to render pontoon solar collection, as taught by John Laing, economically practical.

The Applicant invented solutions to these problems. While there are undoubtedly other ways to solve these primary problems, the Applicant sets forth in the subject application a solution for each of these problems that he developed on his own time. The Applicant found success by contravening pontoon construction conventions, such as symmetry, rather than following the prior art. The Applicant in fact designed a highly asymmetric pontoon which, in a preferred embodiment, even requires the lens to direct light rays not to a point behind the center of the lens, but to a point offset from such midpoint. The resulting non-zero average angle by which incoming light is bent over the surface of the lens is expressly claimed, for example, in Claims 4 and 11 as presently pending. These very inventive changes to pontoon design enabled efficient passive cooling of the solar collection devices even when the pontoon is tilted at a substantial angle away from vertical, by minimizing thermal impedance between each collector device and the bath liquid. While for the most part not expressly claimed, the exemplary features described by the Applicant in the subject application enable one of skill in the art to practice the Applicant's invention, a thing that was not previously possible. As to the shadowing problem, the Applicant invented several special lens configurations

to ensure substantially uniform illumination of target photovoltaic cells even in the presence of mutual shadowing by adjacent pontoons, which is decried by John Laing.

John Laing failed to solve these problems on his own, but copied the Applicant. John Laing did not perceive solutions to these problems, and accordingly believed that two-axis tracking was not practical with a pontoon solar collection system. John Laing was unable to satisfactorily employ two-axis tracking (as taught by Cluff) with pontoon-mounted concentrating photovoltaic cells. Laing was well aware of the advantages provided by two-axis tracking systems, but taught away from such systems because he believed that the problem was not economically solvable.

Evidence of the expert's inability to effectively implement two-axis tracking pontoon solar collection: The Examiner can readily see that if Laing had been able to build two-axis tracking pontoon systems, he would not have been so disparaging of them. He particularly would not disparage them if he thought the idea was good enough to warrant development. The fact that Laing did not develop such a system, despite the well-known advantages of two-axis tracking, is substantial circumstantial evidence of his inability to do so.

Further strong evidence of John Laing's inability to implement two-axis tracking with pontoon solar collection is provided by the fact that he copied the Applicant's ideas as soon as they were presented to him, in confidence, and applied for patent on them in his own name, without naming the Applicant who is the true inventor. Indeed, the Applicant filed the earliest priority document for the subject application only one day before John Laing filed his own application for the subject matter. For the record, on information and belief the undersigned is firmly convinced that John Laing is not the inventor of many of the features that are either claimed, or are required to enable claimed features, in his PCT application PCT/EP02/11309, filed 9 October 2002 and having earliest priority date 12 October 2001, and published as WO 03/034506 A2, which is of record by virtue of having been submitted in an earlier IDS in respect of the subject application.

The Examiner's attention is directed to the "Summary of the Invention" in Laing's PCT/EP02/11309, in which Laing suddenly and completely reversed his earlier disparagement of two-axis tracking, now that the Applicant has developed solutions to the problems. WO 03/034506 A2 states (pg. 2 lines 8-13) that it uses two-axis tracking, and that (emphasis added): "the following measures are taken to approach levels of areal efficiency an order of magnitude above the prior art." The contrast between Mr. Laing's earlier disparagement of two-axis tracking, and his glowing praise for such systems after they are enabled by the Applicant, strongly evidences that two-axis tracking pontoon solar collectors as claimed by the Applicant are nonobvious.

Thus, far from being obvious to combine Cluff with Laing, it was very, very difficult. There was a low probability of success; the expert Laing believed it economically impractical, as stated in the Laing reference and quoted above. The Applicant's claimed invention is thus based on his significant advances in the art of solar energy collection.

In view of the remarks set forth above, and in view of the strong implication that Examiner Diamond considered claims substantially identical to Claims 1 and 8 to be inventive over Cluff even in view of Laing, the Examiner is respectfully requested to withdraw the rejections of independent Claims 1 and 8. Moreover, because all other claims that would be pending after entry of the above amendment properly depend from one of these two Claims, they are also properly allowable over the cited combination of Cluff and Laing. As such, the Examiner is respectfully requested to withdraw all grounds of rejection of Claims 1-14 as currently pending.

Conclusion

It is respectfully submitted that the amendment and remarks set forth above overcome each objection and ground of rejection set forth by the Examiner. As such, the Examiner is respectfully requested to reconsider the application, to withdraw all objections and rejections, and, barring the discovery of new grounds for rejection, to promptly issue a Notice of Allowance of all pending claims.

The Commissioner is authorized to construe this paper as including a petition to extend the period for response by the number of months necessary to make this paper timely filed.

Respectfully submitted,

2-27-2008
Date: February 27, 2008

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